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Dated 14 September 2004

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GB 0313845.0

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Incorporated in the United Kingdom,

[ADP No. 00798298001]

Patents Form 1/77

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16JUN03 E815230-1 B12663
P01/7700 0.00-0313845.0

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1. Your reference

13 JUN 2003

2. Patent application number
(The Patent Office will fill in this part) 0313845.0

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

James Allan HUDSON
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LA1 4YT

SECTION 30 (1977 ACT) APPLICATION FILED 11/8/04

Patents ADP number *(if you know it)* 8652851001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention

Visual overloading

5. Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

URQUHART DYKES + LORD LLP.
TOWER NORTH CENTRAL
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51/77 11/8/04

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Country	Priority application number *(if you know it)*	Date of filing *(day / month / year)*

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Number of earlier application	Date of filing *(day / month / year)*

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a) any applicant named in part 3 is not an inventor, or
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Continuation sheets of this form	
Description	2
Claim(s)	
Abstract	1
Drawing(s)	2x2

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Priority documents	
Translations of priority documents	
Statement of inventorship and right to grant of a patent *(Patents Form 7/77)*	
Request for preliminary examination and search *(Patents Form 9/77)*	
Request for substantive examination *(Patents Form 10/77)*	
Any other documents *(please specify)*	

11. I/We request the grant of a patent on the basis of this application.

Signature Date 12-6-03

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Visual Overloading

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Abstract

The physical constraints of modern interfaces can lead to phenomena such as visual clutter, which poses particular problems in text input and web browsing on handheld devices. My research is concerned with using theories of physical and cognitive ergonomics to support the development of richer graphical interfaces that make economical use of graphical interface real estate and cognitive resources. I focus specifically on improving touch screen interaction through animated graphical layering and gesture interaction.

1 Introduction

In my approach I make use of animated transparent layers that permit the user to selectively view elements that overlap in the visual terrain (Silvers 95, Ishantha 95) and to switch between these layers with a slight cognitive load, rather than through the explicit rearranging of windows that is necessary in existing user interfaces. Moreover, layers permit the intensive population of the locus of visual attention with fewer restrictions on window management.

The incorporation of gestures provides further conservation in screen real estate (Rakowski 01) and subsequent reduction of the ergonomic overheads of obtrusive dialogues and menu items, through overloading the functionality of an icon with simple gestures.

2 Examples of interface overloading

Following are some specific examples of interface overloading that highlight the salient features of my approach, such as screen real-estate preservation (Kamba 96), device function overloading with gestures and the effective broadening of the locus of visual attention through animated control elements (McGuffin 02).

2.1 Example: Gesture activated transparent overlaid control elements

The use of animated transparencies permits the superimposing of layers of control elements, as studied elsewhere (Bartlett 92, Harrison 95) or even gesture activated buttons overlaid onto the output text or work context, without compromising the coherence of competing layers (see Fig. 1). To select an action, the user executes the appropriate gesture stroke that ends over the selected button or region.

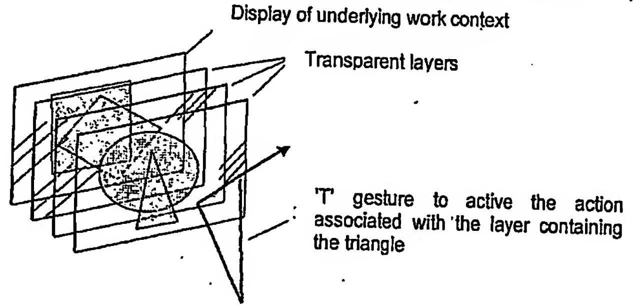

Figure1. A schematic depiction of an overloaded button. Executing a appropriate gesture, such as a 'D' for the diamond or a 'T' for the triangle, etc., over the collection of layered shapes, invokes the action associated with the desired layer.

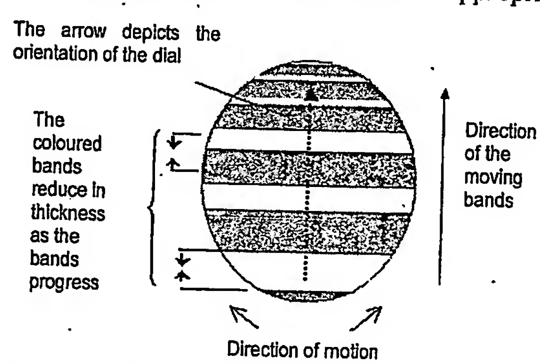

Figure 2. The device makes use of transparent animations with alternating contrasting bands progressing over the surface to make the dial prominent to peripheral vision.

The use of layers permits the intensive population of controls that occupy the same space. Overloaded controls benefit from having a larger target area that permits manual interaction without using too much of the available display area. Gesture interaction is restricted to one action for each execution of a gesture. The additional context of the region

of the display a gesture is executed as a determinant of the desired action enables the number of commands related to a gesture to be increased. This effectively gives my model more scope to overload the functionality and reduce the number of necessary control elements in a given display.

2.2 Example: Periphicon

I now consider an example that illustrates how carefully chosen animated transparencies can improve the functionality of an adaptive mechanism by reducing its intrusiveness and elegantly increasing the prominence of control elements. Animated components effectively broaden the visual field. For example, consider controls that can be interpreted with peripheral vision, and that facilitate unobtrusive redundancy and the adaptivity of smart interface controls. The approach thus improves the functionality of an adaptive mechanism by easing its intrusiveness and elegantly increasing the prominence of control elements.

The "Periphicon" (see Fig. 2) is a device consisting of an animated transparent graphical layer that features alternating bands of light and dark colour progressing over its surface. The orientation of the device is indicated by the direction of the progressive bands of light and dark.

This device is suited to interpretation via peripheral vision. Users have little difficulty reading the dial through the corner of their eye. The user can quite easily view the background and the superimposed Periphicon, which eliminates the cognitive interruption associated with the redirecting of gaze. Thus, the field of vision of the user is effectively broadened. This could be particularly useful for an in car navigation system or speedometer, a download progress indicator or even status indicator for a critical system or computer game.

2.3 Example: Gesture optimised menu items

I explore cognitively ergonomic design heuristics, such as the desirability of avoiding interruptions of attention caused by intrusive dialogues that often obscure the underlying display. Consider, for example, the way that submenus cause a high short-term memory load through the obscuring of the underlying work context and the visual search overhead when the user is required to select from a large list of options.

I propose an approach that reduces both memory load and visual scanning of items by using a menu system where drawing a letter over a menu collects all the commands from that menu beginning with the appropriate letter. Then the system groups these commands together in a smaller, easier to handle, menu. In some cases there may only be one item in the list, thereby dramatically reducing the necessary visual search.

3 Conclusion

I offer the user a further veneer of redundancy for the execution of familiar commands. This avoids the laborious navigation of increasingly larger and complex menu systems. Additionally, my approach leads to the preservation of display real estate in small handheld devices, and avoids the need for the tedious manual interaction in larger data board devices associated with the need for users to position control elements that are beyond their reach.

My future work includes a study of the benefits of animated control elements and their specific use in broadening the user's field of vision to facilitate adaptive and smart interfaces. I are also interested in studying the cognitive benefit of overloaded gesture driven control elements.

References

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Rakowski 01 Sensiva: The Application of 2D Gesture Recognition Brian Rakowski, Stanford University 2001

Silvers 95 Livemap—a system for viewing multiple transparent and time-varying planes in three dimensional space Robert Silvers Conference companion on Human factors in computing systems May 1995

ASTRACT

Animated transparent layers permit the user to selectively view elements that overlap in the visual terrain and to switch between these layers with a slight cognitive load, rather than the necessary explicit rearranging of windows in existing user interfaces. In addition layers, permit the intensive population of the locus of visual attention with fewer restrictions on windows management

The introduction of gestures (mouse strike gestures I.e. hand writing recognition) provides further conservation in screen real estate and subsequent ergonomic overheads of excessive use of obtrusive dialogues and menu items, with the ability to overload the functionality of an icon with simple gestures.

We explore cognitively ergonomic design heuristics, such as avoiding interruptions of attention incurred by the necessary disposal of intrusive dialogues, which would normally obscure an underlying display.

Animated components effectively broaden the visual field, with for example controls that can be interpreted with peripheral vision, facilitating unobtrusive redundancy and the adaptivity of smart interface controls. In essence the approach improves the functionality of an adaptive mechanism by easing its intrusiveness and elegantly increasing the prominence of control elements.

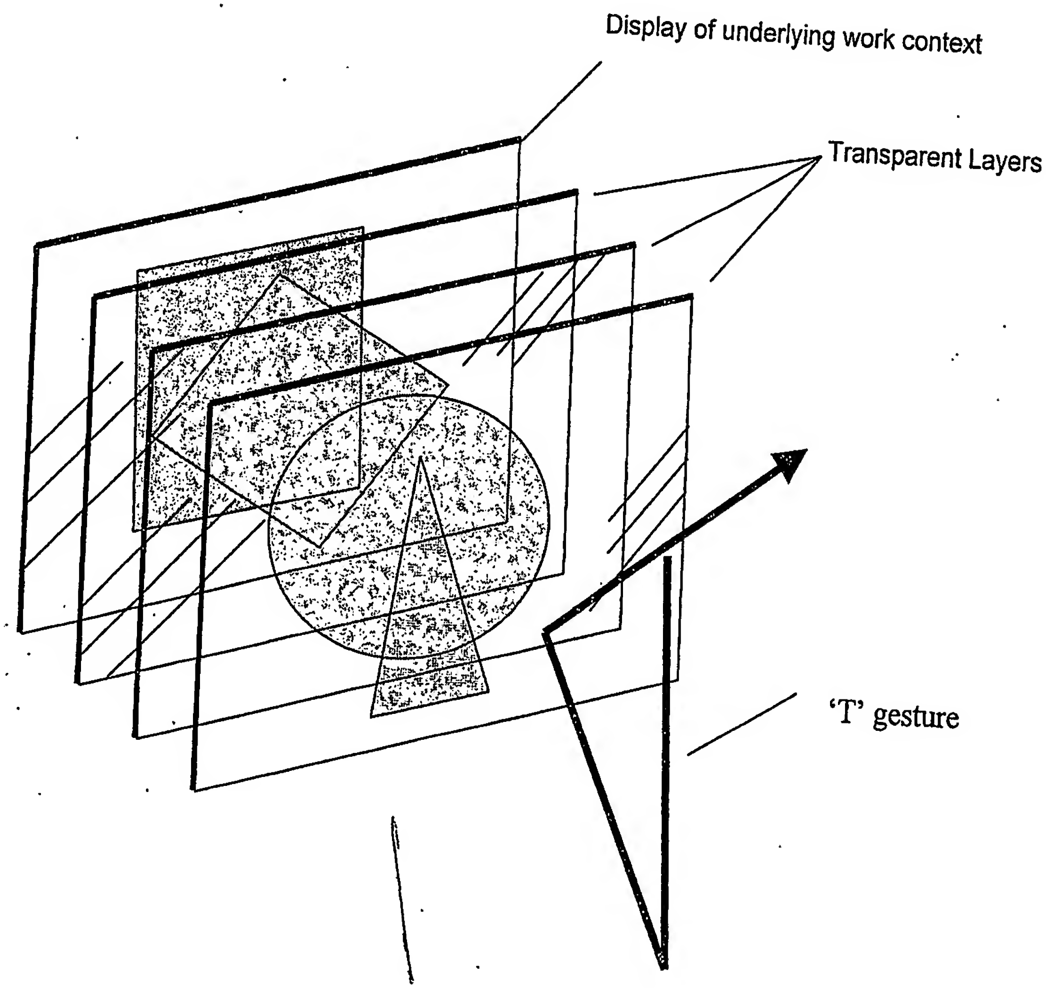
Display of underlying work context
Transparent Layers
'T' gesture

fig 1

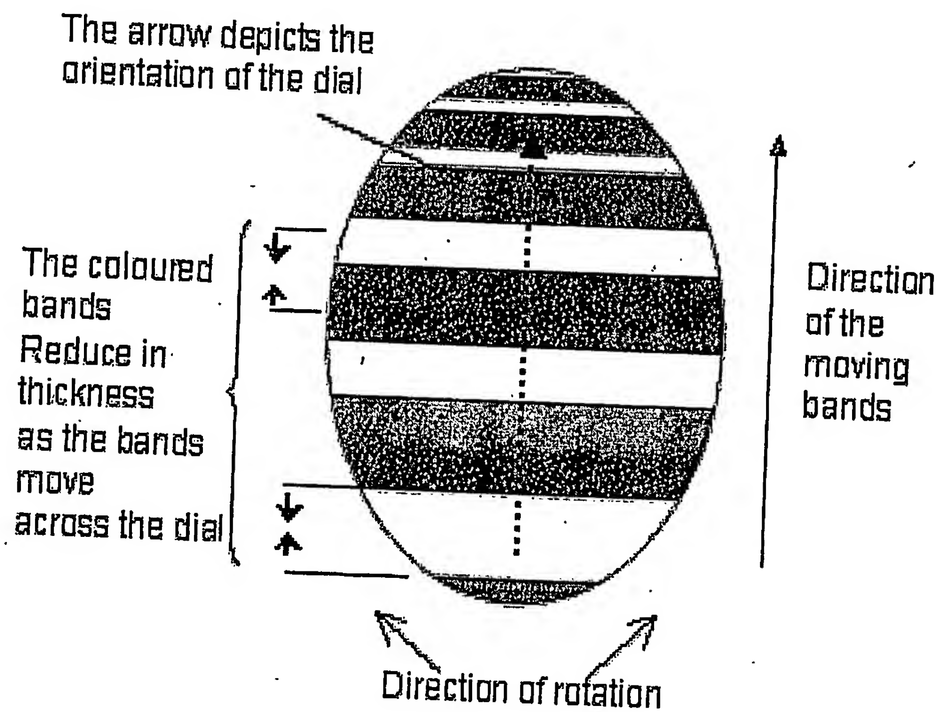
The arrow depicts the orientation of the dial
The coloured bands Reduce in thickness as the bands move across the dial
Direction of the moving bands
Direction of rotation

Figure 2